

Alexander Valley Groundwater Basin, Cloverdale Area Subbasin

- Groundwater Basin Number: 1-54.02
- County: Sonoma
- Surface Area: 6,500 acres (10 square miles)

Basin Boundaries and Hydrology

The Cloverdale area is a sub-basin of the Alexander Valley Groundwater Basin (which includes the Alexander area subbasin to the south), and occupies a structural depression in the Coast Ranges north of the San Francisco Bay. The Cloverdale valley floor is locally bounded by low hills consisting of unconsolidated water-yielding sediments. The basin boundary extends from Alderglen Springs and Preston in the north to about 1 mile south of Asti (the northern boundary of the Alexander area subbasin). The southern boundary is noted by a reduced section of water-bearing materials between Cloverdale and Alexander valleys. The Russian River flows south along the entire length of the basin. It is joined by Big Sulphur Creek, a principal tributary, at the north end of Cloverdale Valley. Precipitation in the Alexander Valley ranges from 40 to 44 inches over the entire basin.

Hydrogeologic Information

Water Bearing Formations

The principal source of groundwater in the Cloverdale area sub-basin is Holocene-age alluvium and to a much lesser extent, the Jura-Cretaceous-age Franciscan Complex. The following description is primarily from DWR (1983)

Quaternary Alluvium. Alluvium, consisting of unconsolidated sand, silt, clay and gravel, underlies the alluvial plains of the Russian River and tributary streams. Thickness ranges from less than 10 feet to more than 80 feet. The alluvium supplies most of the groundwater in the area. The specific capacities of irrigation wells completed into the alluvium generally ranges from 50 to 200 gallons per minute per foot (Cardwell 1965). Wells located away from the river, where little river channel gravel exists, generally have lower yields. Specific yields range between 8 to 20 percent.

Franciscan Complex. The Franciscan complex is described as relatively impermeable bedrock, consisting mainly of poorly sorted sandstone and shale, with lesser amounts of serpentinite, greenstone, chert, and occasionally schist, and generally occurs at the basin margins. The rocks within the complex are generally cut by many fractures; many springs issue from the fractures and supply water to the local tributaries of the Russian River. Springs, and wells completed in the bedrock, which intersect the fractures, supply water for many rural homes in Cloverdale Valley. Well yields are reportedly low; however, they are generally sufficient for domestic use. Specific yields are very low, reported at 3 percent.

Groundwater Level Trends

Hydrographs for three (3) wells in the study area with variable data from 1961 to 1999 indicate essentially no long-term change in water levels (DWR 1983 and DWR unpublished monitoring data).

Groundwater Storage

Groundwater Storage Capacity. Groundwater storage capacity in the basin is estimated at 71,000 af (DWR 1983).

Groundwater in Storage. Based on fall 1980 data, the volume of groundwater in storage is estimated to be 55,000 af (DWR 1983).

Groundwater Budget (Type C)

There is not enough data available to provide an estimate of the basin's budget.

Water Quality

Characterization. Groundwater in the basin is generally characterized as moderately hard to hard.

Based on data from four wells, TDS values ranged from 130 to 304 mg/L and EC ranged from 178 to 454 μ mhos/cm (DWR 1983).

Impairments. Groundwater is generally suitable for all uses. Based on data reported for 3 wells in the study area, 3 have had boron levels exceeding 0.5 mg/l. Boron values below this level are considered satisfactory for all crops; elevated levels may have detrimental effects on crop yields (DWR 1983).

According to the EPA's Superfund Website, one site located at the southern edge of Cloverdale (identified as MGM Brakes) was placed on the Superfund National Priorities List in 1983. Soils on and off-site were reported to contain polychlorinated biphenyls and xylenes. The facility overlies a shallow aquifer 8 to 25 feet below the ground surface. Runoff from the facility drains into Icaria Creek, a tributary to the Russian River. Volatile organic compounds were detected in groundwater off site. Remediation of the site was to include excavation and off site disposal of contaminated soils; natural attenuation was the remedy selected for groundwater contamination (EPA 1983).

Water Quality in Public Supply Wells

Constituent Group ¹	Number of wells sampled ²	Number of wells with a concentration above an MCL ³
Inorganics – Primary	10	0
Radiological	7	0
Nitrates	10	0
Pesticides	9	0
VOCs and SOCs	8	0
Inorganics – Secondary	10	0

¹ A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).

² Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

³ Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Characteristics

Well yields (gal/min)		
Municipal/Irrigation	Range: –	Average: 556 (based on 3 wells)
The maximum pumping capacity reported for the City of Cloverdale's three (3) active wells (nos. 6, 7, and 8) is 2.4 million gallons per day; This results in an approximate yield of 556 gpm for each well (Slade & Associates 2000).		
Total depths (ft)		
Domestic	Range: 20 - 420	Average: 113 (based on 52 wells)
Municipal/Irrigation	Range: 31 - 220	Average: 69 (based on 17 wells)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR	Groundwater levels	3 wells semi-annually
City of Cloverdale		4 wells, not measured
W.S.A		
DWR (incl. Cooperators)	Mineral, nutrient, & minor element.	2 wells every three years
Department of Health Services	Coliform, nitrates, mineral, organic chemicals, and radiological	13 wells, as required in Title 22, Calif. Code of Regulations
City of Cloverdale	Coliform, nitrates, mineral, organic chemicals, and radiological.	One (1) well, as required in Title 22, CCR; frequency varies depending on the constituent, and varies from quarterly, to annual, to greater than annual sampling (personal communications, Mike Falleri, City of Cloverdale Water Department).
W.S.A		

Basin Management

Groundwater management:	None (personal communications, John Wanger, City of Cloverdale)
Water agencies	
Public	City of Cloverdale
Private	

References Cited

- California Department of Water Resources. 1983. Evaluation of Ground Water Resources: Sonoma County. Bulletin 118-4, Volume 5: Alexander Valley and Healdsburg Area.
- Cardwell, G.T. 1965. Geology and Ground Water in Russian River Valley Areas and in Round, Laytonville and Little Lake Valleys, Sonoma and Mendocino Counties, California. USGS Water Supply Paper 1548.
- EPA, Federal Register Notice, September 8, 1983.
- Richard C. Slade & Associates LLC. 2000. Assessment of Groundwater Underflow in the Alluvium, Vicinity of Cloverdale Wellfield, Russian River and River Road Area, City of Cloverdale, Sonoma County, California.

Additional References

- California Department of Water Resources. December 1975. Evaluation of Ground Water Resources: Sonoma County. Bulletin 118-4, Volume 1: Geologic and Hydrologic Data.